

Section II: Remarks

Claims 1-11 are pending.

Rejection of Claims and Transversal Thereof

In the December 23, 2009 Office Action:

claims 1-11 were rejected under 35 U.S.C. §103(a) as being anticipated by Hatter et al. (WO 01/41152) in view of Yokoi et al. (JP 09-281279).

These rejections are respectfully traversed. The patentable distinctions of the pending claims over the cited references are set out in the ensuing discussion.

According to the Examiner, Hatter discloses a process for reducing to metallic form a metal oxide, said metals comprising metal oxides in a mixed oxide sample, however, Hatter fails to explicitly teach the applied potential difference being such as to facilitate selective reduction of one metal oxide at the expense of other metal oxides. According to the Examiner, Yokoi teaches a method of collecting uranium and/or plutonium from the mixture by “controlling a potential applied during the process in order to ensure a selective reduction of the metal oxides.”

It is well established in the law that if the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959).

In the present case, Hatter relates to a process of reducing to metallic form a metallic oxide present in spent nuclear fuel (i.e., irradiated metallic oxide), with oxygen being produced as the only by-product. The produced metals are suitable for use as feeds in subsequent electrorefining processes. In practice, the process of Hatter includes an electrolytic cell having a carbon anode and a mesh basket cathode. The irradiated metallic oxide is placed in the mesh basket. The electrolyte consists of a molten salt such as CaCl_2 . A voltage is applied between the cathode and anode. At the

cathode (the mesh basket holding the irradiated metallic oxide), oxygen atoms diffuse to the surface of the metallic oxide, are ionized to O^{2-} and dissolve in the molten salt and produce oxygen gas at the anode. After electrolysis, a metallic solid remains in the mesh basket. The metallic solid is easily removed and used directly as the feed for an electrorefining process.¹ As recited in Hatter:

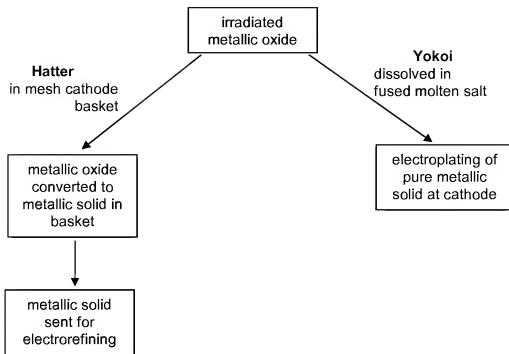
“Changes in the morphology of spent fuel material comprising uranium oxide have been observed following electrolysis, and these changes are indicative of the electrochemical reduction of the oxide to the metal during the course of the process. Thus, the porous structure associated with the oxide is seen to become much less porous as the metal is formed” (see, Hatter, page 4, lines 15-19)

In other words, following the conversion of the irradiated metallic oxide to the metallic solid in the basket, a metallic solid remains where once a porous irradiated metallic oxide was. At no point does the metal or metal oxide dissolve in the molten electrolyte nor is the metal deposited on a cathode.

In contrast, Yokoi describes an electrowinning process whereby used metallic oxide fuel is dissolved in a fused chloride/fluoride molten salt and the metal is deposited at the cathode.

Considering Hatter and Yokoi schematically, it can be seen that they are entirely different processes with entirely different ends.

¹ Electrorefining involves having an anode consisting of unrefined impure metal and as current passes through an electrolyte, the anodes are corroded into the solution and pure metal is electroplated onto the cathode.



Considered *in toto*, it is clear that the proposed combination of Hatter and Yokoi would change the principle of operation of the Hatter invention being modified and as such, the teachings of the references are not sufficient to render the claims *prima facie* obvious. It is unclear how the Examiner proposes that the processes of Hatter and Yokoi be combined knowing that the principles of operation are entirely different. More specifically, the Hatter reference relates to an electrolytic process with the intent to remove oxygen from solid metallic oxide fuels while Yokoi is an electrowinning process whereby used metallic oxide fuels are dissolved in molten salts and the pure metal is electrolytically deposited on a cathode.

Furthermore, Yokoi teaches away from applicants' claimed invention. Yokoi requires that the metallic oxides be dissolved in the fused salt. In contrast, applicants' process does not require the dissolution of the metallic oxides into liquid form. Instead, applicants' process includes the use of an applied potential difference so as to facilitate selective reduction of one metal oxide at the expense of other metal oxides followed by the separation of the metal from the remaining metal oxides. It is not possible to dissolve a mixed metallic oxide in a molten salt, per Yokoi, and selectively reduce "one metal oxide at the expense of other metal oxides" and then "separate[e] the metal from the remaining metal oxides," as claimed by applicants herein.

In conclusion, claims 1-11 are not obvious in view of Hatter and Yokoi. Applicants respectfully request withdrawal of the rejection of claims 1-11 under 35 U.S.C. §103(a) as being obvious in view of Hatter and Yokoi.

Provisional Double Patenting Rejection Under the Judicially Created Doctrine of Obviousness-Type Double Patenting

In the December 23, 2009 Office Action, the Examiner provisionally rejected claims 1, 5 and 6 under the judicially created doctrine of obviousness-type double patenting.

Applicants acknowledge same.

When the obviousness-type double patenting rejection is the only rejection remaining in the presently pending case AND the presently pending claims are an obvious variation of the invention defined in U.S. Patent Application No. 10/479,730 (which can only be objectively assessed when the only rejection remaining in the presently pending case is the obviousness-type double patenting rejection), applicants will assess whether to submit a terminal disclaimer.

Petition for Extension of Time/Fees Payable

Applicants hereby petition for a three (3) month extension of time, extending the deadline for responding to the December 23, 2009 Office Action from March 23, 2009 to June 23, 2009. The fee of \$1110.00 specified in 37 CFR §1.17(a)(3) for such three (3) month extension is hereby enclosed.

The total fee of \$1110.00 is being paid by Electronic Funds Transfer. Authorization is hereby given to charge any deficiency in applicable fees for this response to Deposit Account No. 13-4365 of Moore & Van Allen PLLC.

Conclusion

Based on the foregoing, claims 1-11 are in form and condition for allowance. If any additional issues remain, the Examiner is requested to contact the undersigned attorney at (919) 286.8090 to discuss same.

Respectfully submitted



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By: _____

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